



**FIXED PRICE
RESEARCH & DEVELOPMENT CONTRACT**

Contract No. SPECIMEN Rev. 6-16-03

BETWEEN

**CALIFORNIA INSTITUTE OF TECHNOLOGY
JET PROPULSION LABORATORY
(The "Institute" or "JPL")
4800 OAK GROVE DRIVE
PASADENA, CALIFORNIA 91109-8099**

AND

{CONTRACTOR'S NAME AND ADDRESS HERE}

THIS CONTRACT FOR

**MARS EXPLORATION PROGRAM
MARS TELECOM ORBITER SPACECRAFT DESIGN STUDY**

IS A

SUBCONTRACT UNDER JPL's NASA PRIME CONTRACT

TASK ORDER NO. TBD

A DO - C9 Rating is assigned to this Contract under DMS Regulation 1

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The following documents are incorporated into and made a material part of this contract.

GENERAL PROVISIONS: Fixed-Price Research and Development Contract R 8/01, with Included Exhibits.

JPL 1737, "Release of Information" R 9/99

JPL 2385, "Notification to Prospective Contractors of JPL's Ethics Policies and Anti-Kickback Hotline"
R 7/91

JPL 2892, "Certifications" R 8/01

JPL 2895, "Asbestos Notification" R 9/98

ADDITIONAL GENERAL PROVISIONS (AGPs)

New Technology R 8/01 (Large companies)

OR

Patent Rights - Retention By The Contractor (Short Form) R 4/99 (Small companies)

Prime Contract Expiration – Fixed Price 3/03

{ TC "PREAMBLE" \1 }PREAMBLE

This Contract, entered into on _____ by and between the CALIFORNIA INSTITUTE OF TECHNOLOGY (hereinafter called the "Institute" or "JPL"), a corporation organized and existing under the laws of the State of California, and {Type Name of Contractor Here} (hereinafter called the "Contractor"), a corporation organized and existing under the laws of the State of {Type State of Incorporation here} and constituting a subcontract under prime contract with NASA;

WITNESSETH THAT:

The Contractor agrees to furnish and deliver the supplies and perform the services set forth in this Contract for the consideration stated herein.

Schedule

ARTICLE 1. STATEMENT OF WORK AND DELIVERY INSTRUCTIONS

On or Before

- 1.0 The Contractor shall participate in the Mars Telecom Orbiter Design Study for the Mars Exploration Program. The Contractor shall perform this work effort in accordance with the constraints and requirements outlined in Exhibit I entitled "Mission and Payload Description, Requirements, and Constraints" In the performance of this effort, the Contractor shall:
- 1.1 Develop a spacecraft design that fulfills the requirements for a Mars orbit relay platform during the 2010 – 2020 decade, and also provides for an optical communications demonstration, plus backup optical detection of a Mars sample placed into Mars orbit. Perform trade studies as necessary to arrive at a cost effective design, and prepare the resultant requested technical data and information as described below. These data shall be delivered in the form of viewgraph pages with opposing page narrative text. Eleven copies of the technical data and written information shall be provided to JPL in compact disk (CD) format.
- 1.1.1 Deliver a description of the design and any significant alternatives, using text and/or graphics to highlight the following: 60 calendar days after date of contract.
- 1.1.1.1 The features which provide for ease of manufacturing, integration and prelaunch operations.
- 1.1.1.2 The features which provide for ease of operations during flight (e.g., minimized interactions and constraints among payload elements, simplified ground interfaces with respect to real-time commanding, command sequencing, S/C health assessment, data handling, calibration and maintenance, etc.).
- 1.1.1.3 The features which minimize mass, power, and cost.
- 1.1.1.4 The features identified in trade studies, whether selected or not, which could allow the use of a smaller launch vehicle.
- 1.1.1.5 The features which facilitate achieving 10 earth years in operational orbit about Mars.
- 1.1.1.6 The features which would allow easy integration of the Payload elements addressing both the recommended approach for the interface with the MTO and the recommended delivered configuration

of the Payload elements.

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| 1.1.1.7 | The special requirements on the MTO to accommodate the optical communications experiment. | |
| 1.1.2 | Deliver a list of major system level and subsystem level design trade studies considered in the derivation of the recommended design, with accompanying explanatory text and/or graphics descriptions. For each trade study include the objective and a description of the alternates considered and the reasons for the final selection. If the trade studies resulted in more than one spacecraft design, list the trade study results for the recommended design in detail. For alternate spacecraft designs (if any) describe the differences from the recommended design and the benefits to the mission. | 60 calendar days after date of contract. |
| 1.1.3 | Deliver drawings of the spacecraft configuration for the recommended design, which identify the major components and payload elements. Add additional drawings for any alternate designs if applicable. | 60 calendar days after date of contract. |
| 1.1.4 | Deliver a list of the spacecraft system and subsystem hardware complement and a discussion of the new and heritage designs, or existing hardware elements where available. Include the prior use of each heritage design or origin of existing hardware. Include data for both the recommended design and any deltas for alternate spacecraft designs. | 60 calendar days after date of contract. |
| 1.1.5 | Deliver a mass table of the elements of the recommended design by subsystem to the major component level. (Aggregate minor components, so that the mass of all elements is accounted for.) Include margin sufficient to provide 43% system margin above the current best estimate (margin = allowable growth/current best estimate). Identify the growth margin assumed for each mass element. Show the deltas for any alternate spacecraft designs. | 60 calendar days after date of contract. |
| 1.1.6 | Deliver a table of the major operational power modes for the recommended design to the same level of subsystem detail used in the mass table. Include margin sufficient to provide 43% system margin above the current best estimate (margin = allowable growth/current best estimate). Identify the growth margin assumed for each component. Show the deltas for any alternate spacecraft designs. | 60 calendar days after date of contract. |
| 1.1.7 | Deliver a discussion of the flight software design identifying both the need for new software and the use of heritage software, including a discussion of its prior use and degree of | 60 calendar days after date of contract. |

applicability.

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| 1.1.8 | Deliver a description and any applicable graphics defining the launch vehicle selected for the recommended design. Identify any changes in the launch vehicle selection for alternate spacecraft designs. | 60 calendar days after date of contract. |
| 1.1.9 | Deliver a discussion of the Mission Assurance features required in order that the recommended spacecraft design achieves a 10 year on-orbit lifetime with particular attention paid to electronic parts. | 60 calendar days after date of contract. |
| 1.2 | Prepare the following cost estimates for developing and delivering the recommended spacecraft design for the implementation and delivery options specified below. The cost estimates and deltas shall be in the form of a cost breakdown in real year dollars, using a Work Breakdown Structure that separates costs according to essential elements, such as management, systems engineering, individual subsystem, I&T, etc. The depth of subsystem costs shall be at least to the major subsystem component level, with comparable depth in the other elements. These data shall be delivered in the form of viewgraph pages with opposing page narrative text. Six copies of this data shall be provided to JPL in CD format. At the Contractor's discretion, a second CD version of the technical data (for the purpose only, of incorporating corrections or minor additions for clarification or elaboration) may be delivered at this time. However, any such resubmittal must clearly identify changes from the earlier submittal. | 75 calendar days after date of contract. |
| 1.2.1 | Deliver a cost estimate of the recommended design using the following Option 1 assumptions: the spacecraft contractor provides all the required components, except for the Payloads described in Exhibit I, integrates the provided Payloads into the design, and performs all the functions of assembly, test, and launch operations (ATLO). Include a discussion of cost uncertainties and conditions. | 75 calendar days after date of contract. |
| 1.2.2 | Deliver cost deltas to the same level of detail used in Option 1 (para. 1.2.1) for additional implementation/delivery options, defined as follows. | |
| 1.2.2.1 | Option 2: The same as Option 1, except that the entire Telecom system will be provided as GFE, including system design and engineering, interface engineering, and testing, as well as the telecommunication components. (For purposes of costing, assume form, fit, and function will be the same as in the recommended design.) | |
| 1.2.2.2 | Option 3: Same as Option 2 except that the contractor delivers a tested spacecraft, but without GFE Telecom system components and Payloads to | |

JPL. JPL will perform the physical integration of the GFE Telecom system components and Payloads, full system testing, and launch operations.

1.2.2.3 Option 1a: Provide a delta cost for delivering and launching a second, identical spacecraft in the 2009 opportunity with the assumptions contained in 1.2.1 above.

1.2.2.4 Option 1b: Provide a delta cost for delivering and launching a second, identical, spacecraft in the 2013 opportunity (begins December 2013) with the assumptions contained in 1.2.1 above.

1.3	Conduct an Oral Presentation at JPL of the study technical and cost results. The Oral presentation (4-6 hours in length including time for questions and answers) will be scheduled by JPL after receipt of the cost data report listed in paragraph 1.2. Twenty hardcopies and a CD version of the oral presentation shall be provided.	82 calendar days after date of contract.
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1.4	Deliver by email a biweekly top level progress report summarizing activity to date and projected activity for the next two weeks.	From date of contract through presentation of technical data report.
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1.5 Applicable Documents: The following exhibits are hereby incorporated into and made a material part of the Contract:

1.5.1 Exhibit I, "Mars Telecom Orbiter, Spacecraft Design Study, Mission and Payload Description, Requirements, and Constraints", Dated: June 13th 2003.

2.0 Delivery Instructions

2.1 Except as otherwise provided in this Contract, the point of inspection, acceptance and delivery of all supplies deliverable under this Contract shall be the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, California 91109. All such supplies shall be packaged, packed, boxed, or crated in such a manner to ensure safe delivery and shall be shipped prepaid and at the Contractor's expense to the point of delivery.

2.2 Time is of the essence in the performance of this Contract

If New Technology is Applicable **DELETE IF NOT**

2.3 The Contractor shall furnish the Contracting Officer (CO) with the annual and final reports of reportable items described in the Article entitled "New Technology." Copies of transmittal letters for those reports shall be sent to the JPL Intellectual Property Office (IPO) and to the cognizant JPL negotiator.

If Patent Rights is Applicable **DELETE IF NOT**

2.4 The Contractor shall provide the Contracting Officer (CO) the annual and final reports of subject inventions described in the Article entitled "Patent Rights - Retention by the

Contractor (Short Form)." Copies of transmittal letters shall be sent to the JPL Intellectual Property Office (IPO) and to the cognizant JPL negotiator.

3.0 Period of Performance

- 3.1 The period of performance shall extend from the execution date of this Contract through 100 calendar days.

ARTICLE 2. PRICE AND PAYMENT

- 1.1 Total Fixed Price: Not to Exceed \$200,000
- 1.2 Minimum Level of Effort
The Contractor agrees to supply, at a minimum, TBD hours of Engineering effort in the performance of the tasks defined in Article 1 STATEMENT OF WORK and to maintain adequate records to show the hours expended. If after receipt of the deliverables defined in Article 1 it is JPL's judgment that the Contractor may have supplied less than TBD hours the Contractor shall be required to disclose the actual Engineering hours applied to the tasks defined in Article 1. If after JPL's examination of the Contractor's records the number of Engineering hours is less than TBD hours the Contractor shall either be required to expend additional Engineering hours up to TBD hours in order to supply JPL with acceptable study deliverables; or reduce the total fixed price of the contract. The Contractor shall not be entitled to an equitable adjustment should the expended Engineering hours exceed the maximum.
- 1.3 Invoices. Invoices shall be submitted, in triplicate, to JPL Supplier Payment Section, M/S 601-208, 4800 Oak Grove Drive, Pasadena, California 91109

ARTICLE 3. SPECIAL PROVISIONS

1.1 Data Removal from Computers.

The Contractor shall erase or otherwise remove all data (which can include sensitive, Privacy Act, proprietary, and mission critical data) from hard drives and other computer storage devices and remove licensed software from Government-owned computers before such computers leave the control of the Contractor organization by transfer or disposal. JPL data shall also be removed from Contractor-owned computers when the computer will be no longer used for this Contract. The Contractor shall archive all data required to be retained, pursuant to the "Rights in Data - General" Article. Guidance on what constitutes mission-critical data and sensitive information (such as business and restricted technology information and scientific, engineering, and research information) is contained in NASA Procedure and Guidelines for Security of Information Technology (NPG) 2810, available on the worldwide web or from the JPL Negotiator. Proprietary data consists of trade secrets and other commercial or financial information confidential to the individual owner or organization. Proprietary data is normally labeled as such. Trade secrets or commercial or financial information that has been released to the public or is otherwise in the possession of persons other than the individual owner or organization is in the public domain and may no longer be entitled to proprietary protection.

The Contractor shall submit to JPL a written certification that all applicable data has been erased or otherwise removed from computers when returned to JPL or disposed of.

1.2 Key Personnel/Facilities

The personnel and/or facilities, if any, specified below in paragraph (b) are considered essential to the work being performed hereunder. Prior to removing, replacing, or diverting any of the specified individuals or facilities, the Contractor shall notify JPL reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on this Contract. No diversion shall be made by the Contractor without the written consent of JPL; provided, that JPL may ratify in writing the change, and such ratification shall constitute the consent of JPL required by this Article. Paragraph (b) below may, with the consent of the Contracting parties, be amended from time to time during the course of the Contract to either add or delete personnel and/or facilities, as appropriate.

The following Contractor personnel shall be considered Key Personnel under this Contract:

(Will include a name or names; and fraction of full time agreed to, or hours proposed - e.g., "Bruce Wayne - Full Time" or "Clark Kent - 20 Hours")

1.3 Taxes – Withholding

JPL may withhold from any payments, which are due and payable under the Contract, such amounts that JPL determines must be withheld in compliance with State and/or Federal Tax Withholding requirements. JPL shall not be liable for amounts incorrectly withheld under this Provision; provided, however, that if JPL determines that any amounts due to the Contractor have been incorrectly withheld, and said amounts have not already been remitted to the taxing authority, JPL will pay such amounts to the Contractor within a reasonable period of time.

{ TC "SIGNATURE PAGE" /1 }IN WITNESS WHEREOF, the parties hereto have executed this Contract as of the day and year first above written.

CALIFORNIA INSTITUTE OF TECHNOLOGY

CALIFORNIA INSTITUTE OF TECHNOLOGY

By _____
{ NAME OF ACQUISITION REP HERE }

(Title)

{ NAME OF CONTRACTOR HERE }

By _____
(Signature)

(Typed Name)

(Title)

Instructions to Contractor: Do not insert date on Preamble page.